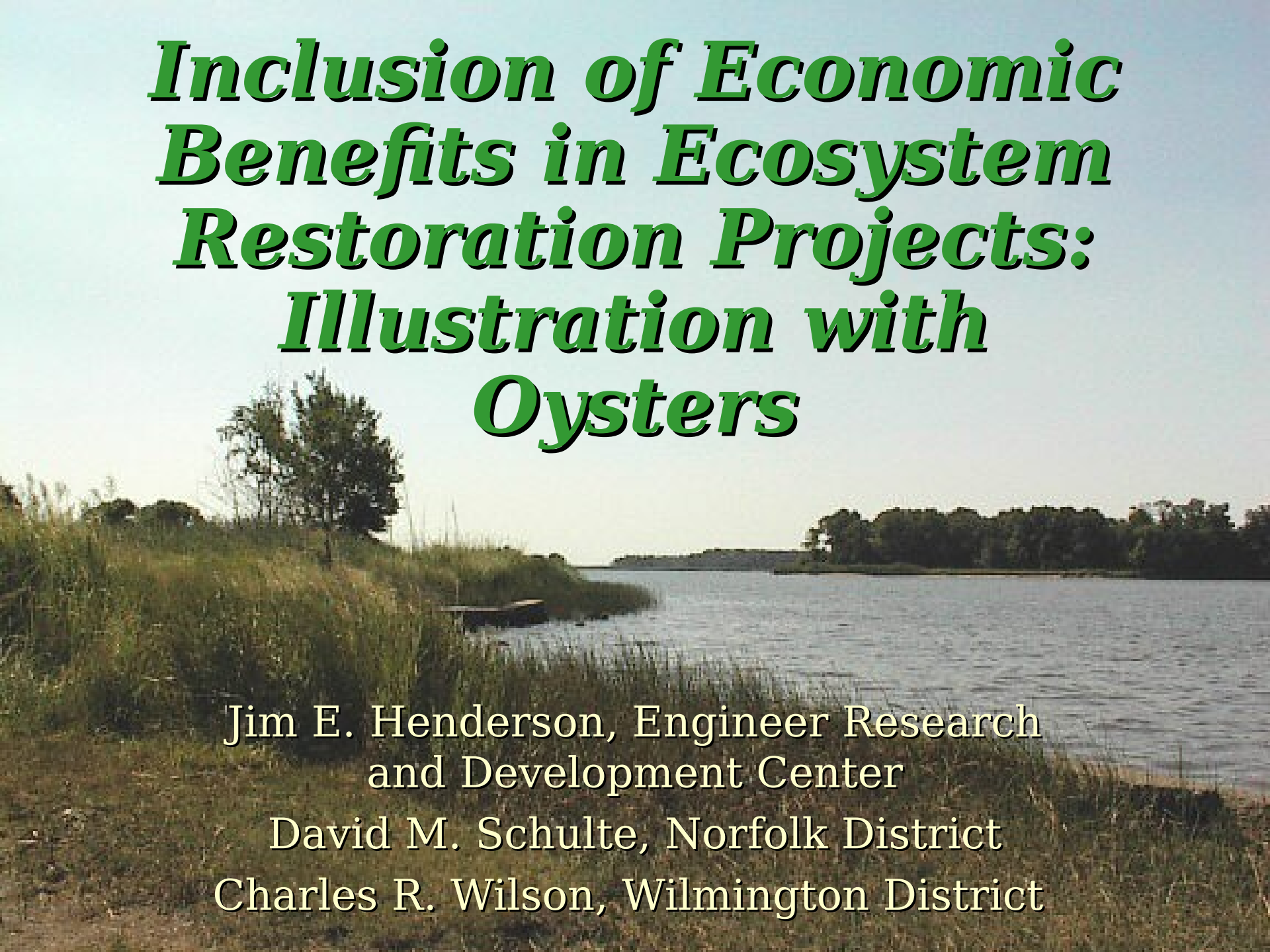
Inclusion of Economic Benefits in Ecosystem Restoration Projects: Illustration with Oysters



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Why Economics ?

- Stakeholder interest
- Information for trade-offs
- Benefits analysis

Approach

- Identify economic services
- Quantify economic benefits
- Summarize economic benefi

Services

- Ecological
  - Habitat
  - Water quality
  - Erosion prevention
- Economic
  - Harvest
  - Water quality
  - Recreation
  - Bank stabilization

Quantification

- Right question to ask ?
  - “What is the economic value of oyster harvest ?”
  - “Are benefits affected by harvest ?”
- Wrong questions ?
  - “What is the benefit cost ratio compared to navigation projects in the area ?”
  - “What’s the incremental cost of an oyster ?”

Quantification

- Area Affected ?
  - Reef only
  - Adjacent reefs
  - Nearshore
  - Watershed

Oyster Harvest

- Analysis – Return on construction cost
- Reef construction methods
  - Construction only
  - Construction and annual broodstocking

Construction

Shell Base Materials	$10,000/acre
Initial Stocking Costs	$10,000-20,000/acre

Broodstocking

Broodstocking Rates	100,000-200,000/acre
Costs	$0.01/oyster
Costs to Broodstock	$20,000/acre

Productivity

No Maintenance Broodstocking	20 bushels/yr
With Annual Broodstocking	100 bushels/yr

Oyster Production

Pounds of Oyster Meat/Bushel	7
Price of Oyster Meat/Pound	$3.13

Value of Oyster Harvest

Bushels Harvested/Acre	Benefits/Acre
20	$ 442
50	$ 1,106
100	$ 2,212
200	$ 4,424

Comparison of Alternative Construction

Alternative	Bushels/Acre	Years to Recover Initial Costs
No Annual Maintenance – Virginia	100	14
Annual Broodstocki		

Harvest – Crabs and Fish

- Reefs have higher value as habitat for other commercial species
- Valuation – marginal value added

Water Quality

- Phytoplankton and fine sediment removal
- Studies related values to uses.

Swimming and Beach Use

- National Review
  - $7.20 to $23.39 per person (Freeman 1995)
- Chesapeake –
  - Beach use – $56 M

    20 percent increase (Bocksteal et al 1989)

Fishing

- National Review
  - Per Person $ 135 - $1,347
  - Per Trip $ 13 - $135 (Freeman 1995)
- Chesapeake Bay
  - $2.3 M (Bocksteal et al. 1989)

Boating

- Chesapeake
  - $ 8 M (Bocksteal et al. 1989)

Erosion Protection and Bottom Sediment Stabilization

Summary

Services	Trade-offs
Harvest	Structural and biotic diversity
Water Quality	Change in aquatic dynamics
Recreation	Redistribution of recreation use.
Erosion Protection	Change in system dynamics

Advantages and Disadvantages of this Approach

- Explicit link of economic value in ecosystem evaluation
- Promotes identification of trade-offs and opportunity costs
- Scarcity of valuation studies requires clear delineation of relevance of analysis and context.
- If goals and objectives are unclear, distraction from ecosystem focus is possible.